

REMARKS

Claims 1-9 and 16-20 are all the claims presently pending in the application. Claims 10-15 stand withdrawn resultant from restriction but are subject to evaluation for rejoinder upon ultimate determination of allowable subject matter.

It is noted that the claim amendments, if any, are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-10 and 16-20 nominally stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over US Patent 6,642,539 to Ramesh et al. It is noted, however, that claim 10 is understood as having been withdrawn and that the body of the rejection fails to account for claims 5 and 17, thereby implying that at least these two claims are allowable over Ramesh as based on the rejection currently of record.

This rejection based on Ramesh is respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

As described, for example, in independent claim 1, the claimed invention is directed to a storage medium including a metallic underlayer, a ferroelectric data layer over the metallic underlayer, and a layer over the ferroelectric data layer having a charge migration rate faster than a charge migration rate of the ferroelectric data layer.

As explained at lines 11-17 of page 2 of the specification, no solution has yet been found to the surface depolarization problem that plagues the art of ferroelectric disk technology using vertical polarization of an FE surface, as explained in more detail beginning

at line 22 on page 6, wherein is described a slow loss of surface polarization over several to 24 hours time scale. The inventors recognized that this effect was due not to loss of bulk polarization in the FE film but to accumulation of mobile surface charges which neutralize the bound charges constituting the surface polarization.

The claimed invention provides a solution to the surface polarization by providing a layer over the ferroelectric data layer that has a charge migration rate that is faster than the charge migration rate of the ferroelectric data layer.

II. THE PRIOR ART REJECTION

The Examiner alleges that newly-cited Ramesh renders obvious the present invention as defined by claims 1-10 and 16-20. Applicants respectfully disagree.

In the rejection currently of record, the Examiner has found some similarity in materials commonly used in Ramesh and the claimed invention, as indicated for the rejection of dependent claims 2-4, 6-9, 16, and 18-20. The Examiner also alleges that this alleged similarity of materials means that the initial burden of a *prima facie* rejection has been met so that the burden shifts to Applicants to rebut that “... *the prior art properties are different from those claimed.*”

In response, Applicants first respectfully point out that similarity of materials alone would not be sufficient to establish obviousness, since the claimed invention also defines a structure involving these materials used in various exemplary embodiments. Contrary to the Examiner's presumption, the burden does not shift until this claimed structure has been demonstrated in the prior art rejection. That is, a rebuttal based on the properties of these common materials are not at issue in the present evaluation unless the common materials are used in structure having identical functions, which is clearly not the case in Ramesh.

Therefore, Applicants respectfully traverse the Examiner's position that the Examiner

has met the initial burden in the rejection currently of record, since the underlying principle of operation of the present invention is completely different from that of Ramesh and the rejection of record fails to demonstrate in Ramesh the structure defined by the plain meaning of the language of even the independent claim. Contrary to the Examiner's position that the burden has shifted to Applicants, until the rejection reasonably points out specific components in the figures/text of Ramesh that satisfy the plain meaning of the structure of independent claims 1 and 16, the initial burden has not been met by the Examiner and the burden has not shifted back to Applicants.

However, to address the differences in structure/operation, as explained in lines 11-13 of page 2 of the disclosure, the underlying principles of operation of the present invention includes that of using ferroelectric bits that are on the order of one nanometer. This concept of bit storage is entirely different from the technology described in Ramesh, which relies upon storage cells comprising transistor structures 12-18 shown in Figures 1, 5, 7, and 9 of this reference.

In contrast to Ramesh, as exemplarily shown in Figure 1 of the present application, the present invention stores bits of information as very localized portions of polarization of a ferroelectric data layer (e.g., FE DL, 101), using vertical polarization (e.g., an electric field normal to the disk surface) as the mechanism to write data. As explained in lines 19-20 of page 6, as of the filing date, the inventors had been able to achieve the capability to write patterns on the scale of 1000 \AA , a density considerably greater than that possible using transistor-based memory cells such as used in Ramesh.

As explained at lines 20-21 of page 6, the problem being addressed by the present invention is that the inventors recognized there to be a slow surface depolarization of the polarization-written information. As explained at the top of page 7, the inventors were able to discover that this slow loss of surface polarization was not due to a loss of bulk

polarization in the FE film, but, rather, was due to accumulation of mobile surface charges which neutralize the bound charge constituting the surface polarization.

The solution offered by the present invention is that of providing an overlying conducting layer (e.g., layer 211 shown in Figure 2), thereby shielding against this depolarization.

Therefore, the type of ferroelectric memory of the present invention is entirely different from the ferroelectric memory cell used in Ramesh, even if there are some coincidental similarities in some materials. That is, there is nothing in Ramesh that corresponds to the structure 210 shown in Figure 2 of the present application and as described in the independent claims, and the Examiner makes no attempt in the rejection of record to point out such corresponding structure in Ramesh. Absent such demonstration of corresponding structure, the rejection clearly fails to establish a *prima facie* rejection.

Along this line, it is noted that the “broadest reasonable interpretation” of any disputed claim terminology must be consistent with the description in the disclosure of the application under evaluation, as clearly explained in the first sentence of MPEP §2111: “*During patent examination, the pending claims must be given their broadest reasonable interpretation consistent with the specification.*” (emphasis by Applicants)

Therefore, contrary to the implication in the rejection currently of record, merely identifying common materials in the prior art reference does not provide any indication of equivalent structure and/or inherency to the claimed invention, if for no other reason that the underlying technology and structure of Ramesh is completely different from (e.g., inconsistent with) that described by the specification of the present application.

Hence, turning to the clear language of the claims, in Ramesh there is no teaching or suggestion of: “*A storage medium, comprising: a metallic underlayer; a ferroelectric data layer over said metallic underlayer; and a layer over said ferroelectric data layer having a*

charge migration rate faster than a charge migration rate of said ferroelectric data layer", as required by independent claim 1. The remaining independent claims have similar language.

Therefore, Applicants respectfully submit that there are features of the claimed invention that are not taught or suggested by Ramesh, and the Examiner is respectfully requested to reconsider and withdraw this rejection based on Ramesh.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-9 and 16-20, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance, and that withdrawn claims 10-15 are also in condition to be rejoined and allowed. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,



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